# A GENUS OF MARITIME DOLICHOPODIDÆ NEW TO AMERICA.

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PLATE IV.

OF THE three maritime genera of Dolichopodidæ described from Europe, viz., *Machærium*, *Thinophilus* and *Aphrosylus*, only one has hitherto been found to be represented in this country. This is *Thinophilus*, of which I described a species from Wyoming during the past year.[1] While working on the marine fauna of Monterey, California, during the summer of 1896, and again during January of this year, while similarly engaged at San Diego, California, I observed three species of Dolichopodidæ flitting about in the spray of the breakers among the sea weeds on the rocks below high water mark. Closer examination shows that the three species are all new, and that they are assignable to *Aphrosylus* Walker, a genus comprising four European species: *A. ferox* Walk., *A. celtiber* Hal., and *A. raptor* Walk., from the sea coasts of Northern Europe, and *A. venator* Loew, from the coast of Italy.

Loew[2] sums up the characters of the genus *Aphrosylus* in the following words: "The first joint of the antennæ without hair, the second of the usual transverse form, the third tapering at the tip; the arista entirely apical. The face narrowed above, especially in the male. The proboscis turned towards the breast. Palpi disengaged, hanging downward, in the male larger than in the female. The abdomen of the male shows six segments; the short and rounded hypopygium ends in the shape of a knob; its external appendages are elongated, parallel lamellæ, fringed with rather long hair. The female abdomen has only five segments. Wings of rather equal breadth; the posterior

[1] Ent. News, May, 1896, pp. 155-156.
[2] Monograph of N. Am. Dolichopodidæ. Smith. Misc. Coll., 171, 1864, p. 148.

transverse vein is less distant from the margin of the wing than its own length; the end of the fourth longitudinal vein is parallel with the third. Feet with rather coarse bristles; the first joint of all the tarsi is much longer than the second; the first joint of the hind tarsi without bristles."

In all these characters the Californian species agree with their European congeners. They may be distinguished from one another thus:

*a.* Arista of the antenna naked, posterior cross-vein at right angles to the fourth vein ..... *b.*
Arista pubescent, posterior cross-vein forming an obtuse angle with the fourth vein..... *Aphrosylus grassator.*
*b.* Wing with a black blotch covering the distal end of the discal cell, fore and hind femora ciliated above..... *A. direptor.*
Wing without a black blotch, fore and hind femora eciliate.
*A. prædator.*

## Aphrosylus prædator, sp. nov.

PLATE IV, FIGS. 1–6.

*Male.*—Length of body 2–3 mm; length of wing 2.5–3 mm. Antennæ black, first joint rapidly widening distally, second short, spheroidal, with black bristles, third tapering rather uniformly from a broad base to a point, and covered with short hair and with a few scattered, short, spine-like bristles, which are more numerous on the ventral than on the dorsal surface. The two-jointed arista is long and flexuous, its basal segment about one-third as long as the third antennal joint and, like this joint, covered with short hairs; the apical segment bare. Face metallic green, thickly covered with gray dust, narrow towards the middle where there is a distinct indentation at the orbit on either side. The lower portion of the face projects forward somewhat. Palpi large, black, with black hairs. Proboscis swollen, cylindrical. Posterior orbit metallic green, with thick gray dust and black cilia. Thoracic dorsum metallic green overlaid with a thick layer of brown dust; the dorsal and acrostichal bristles prominent, black. Pleuræ black, with or without very slight metallic green reflection, covered with gray dust. Scutellum of the same color as the thoracic dorsum, with four bristles, the median pair long and thick and directed upwards and forwards; the lateral pair small and weak and directed backwards. Abdomen suddenly narrowed at the fourth segment, above metallic green, somewhat less opaque than the thoracic dorsum, and covered with black hairs, below blackish and covered with pale dust and hairs like those on the dorsal surface. What is to all appearances a rudiment of the seventh abdominal segment overlaps the base of the hypopygium on the left side. Hypopygium large, its swollen base black, without hairs; the pair of external appendages bent forwards at a right angle

near their tips, black. Each of these appendages bears a piceous or gray lamella on its antero-lateral edge above the angle. This lamella is fringed along its edge with weak hairs, the appendages with stubby black bristles, which are especially abundant on the mesial surfaces. The inner appendages are yellowish, the sinuate penis short and broad, with its point directed forwards. In life the hypopygium is folded up against the ventral surface of the fourth to sixth abdominal segments, somewhat like the blade of a closed pocket-knife. In this position both the inner appendages and the tips of the outer appendages are invisible. Legs black (in alcoholic specimens piceous), with a dull metallic green reflection, especially on the femora, and bristly with black hairs. The ground color of the legs is obscured by a layer of pale dust. Fore coxæ with conspicuous black hairs on their anterior surfaces; fore femora somewhat thickened proximally, with about a dozen prominent black spines below directed at right angles to the surface. The fifth joint of all the tarsi somewhat broader than the other tarsal joints. First joint as long or nearly as long as the second to fourth joints taken together. Fore tibia with a strigil-like comb of pale hairs near its distal end on the inner side. Hind femur with a few long bristles near its tip on the outer side; middle tibia with a few similar bristles near the proximal end on the outer side. Wings gray, rather opaque, with faint traces of a darker cloud on the posterior cross-vein, which is at right angles to the fourth longitudinal vein and scarcely more than its own length distant from the posterior margin. Terminal segments of the second to fourth veins parallel and slightly bent. Sixth vein short but distinct. Anal angle of the wing not very prominent. Halteres pale yellow throughout. Upper cilia of the piceous tegulæ white, lower cilia black.

*Female*.—Length of the body 3–3.5 mm.; length of wing 3.5–4 mm. Differs from the male in having a somewhat broader face, in the absence of the spines on the lower surfaces of the fore femora, and in the shape of the abdomen, which is much swollen in my specimens and consists of only five visible segments. Its tip, provided with the small black or piceous ovipositor, is turned upwards.

Of this, the most abundant of the three species, I have collected 200 specimens, 100 of either sex. The flies are gregarious, and seem to feed on the small animals which they find among the fronds of the *Fucus* and *Endocladia* on the rocks. The females are more common than the males. From July 1st to August 5th, 1896, this species was observed almost daily at Pacific Grove, California, and along the coast to the southward as far as Point Lobos. It was also seen, January 15th to March 10th, in smaller numbers, at Point Loma and La Jolla, San Diego County, California. It will probably be found to occur throughout California wherever the coast is rocky.

## Aprosylus direptor, sp. nov.

PLATE IV, FIGS. 7-10.

*Male.*—Length of body 2.5 mm.; length of wing 3.5 mm. Face dull metallic green, rather thickly covered with pale dust, palpi somewhat smaller than in the preceding species, black, with black hairs. Antennæ black, first and second joints as in the preceding species, third joint shorter and more oblong, owing to a blunt projection on the ventral side near the insertion of the arista; basal segment of the arista short, hairy; apical segment long and bare. There are a few prominent bristles on the third joint similar to those found in *A. prædator*. Cilia of the superior and inferior orbits black, not very prominent. Thoracic dorsum metallic green, opaque, with a thick layer of brownish dust; acrostichal and dorsal bristles prominent, black. Pleuræ and scutellum as in *A. prædator*. Abdomen metallic green, overlaid with white dust and covered with short black hairs; the six segments are of nearly uniform length and taper gradually to the insertion of the hypopygium. Hypopygium smaller than in the preceding species. Its swollen and hairless base bears the scale-like rudiment of the seventh segment on the left side. The pair of outer appendages is considerably shorter than in *A. prædator* and directed forwards from their insertions. They are black and covered with black bristles, those on the mesial surfaces being short and stubby. The yellowish inner appendages are concealed, with the exception of the penis, which is long and delicate, and passes backwards between the outer appendages, so that its recurved end projects a short distance beyond the tip of the abdomen. Legs dull metallic green, blacker distally, covered with pale dust and black bristly hairs. Fore coxæ with conspicuous black hairs on their front faces, fore femora thickened proximally, without spines on their lower faces, but with a row of long black cilia along their upper surfaces. The strigil-like comb of pale hairs near the tip of the fore tibia is more prominent than in *A. prædator*. Hind femur with a row of black cilia on the upper surface of its proximal half. Wings without prominent anal angle, gray, somewhat opaque; venation as in the preceding species. A large black blotch covers the distal end of the discal cell and the posterior cross-vein, and extends up half-way between the third and fourth veins. Halteres dull light yellow. Cilia of the tegulæ black.

*Female.*—Length of body 3–3.5 mm.; length of wing 3.5–4 mm. Apart from the primary sexual characters the female differs from the male only in having a somewhat broader face. The female even has the cilia on the fore and hind femora, a character which we should hardly expect to find in this sex.

The above description is drawn from one male and six female specimens. These were taken in company with *A. prædator* at Pacific Grove, California, July 5th and 31st. Though rarer than the last mentioned species, *A. direptor* was frequently observed flying about among the sea weeds. In the living insect the black spots of the two wings coincide

when these appendages are folded over the back, and the additional intensity which the blotch thus acquires enables one to recognize the species at a distance of a few feet.

### Aphrosylus grassator, sp. nov.

Plate IV, Figs. 12, 13.

*Male.*—Length of body 1.5 mm.; length of wing 2 mm. Antennæ black, third joint very short, beset with short hairs and a few black bristles, which, as in the two preceding species, are more numerous on the ventral than on the dorsal surface. Arista long, distinctly pubescent throughout. Palpi not very much enlarged. Body opaque black throughout. Frontal bristles long and prominent, as are also those on the thoracic dorsum and abdomen. Bristles of the scutellum as in the preceding species. Hypopygium large, its outer appendages directed forwards and bent upwards at their tips, which are provided with two short, conical projections. The outer appendages are fringed with very dense and coarse black hairs, especially on their mesial surfaces. The inner appendages are yellowish, and the penis projects backwards and downwards between the outer appendages but not as far as in *A. direptor*. The bristles of the abdomen end on the rudiment of the seventh segment, which, as in the preceding species, is shifted to the left side of the swollen base of the hypopygium. Legs piceous, becoming blacker on the tibiæ and tarsi, bristly. The bristles on the samewhat swollen fore femora rather long and erect. Wings smoky, somewhat opaque, immaculate; costal bristles prominent, third and fourth veins parallel, the latter ending in the tip of the wing and with its proximal segment distinctly incrassated. The posterior cross-vein is very oblique, so that it forms an obtuse angle with the fourth vein. It is more than twice as long as its distance from the posterior margin. Halteres piceous. Tegular cilia black.

*Female.*—Length of body 2 mm.; length of wing 2.5 mm. The face is somewhat broader than that of the male, the proximal segment of the fourth longitudinal vein is not incrassated, and the bristles on the fore femora are not so prominent. The hairs on the last segment of the abdomen are long and prominent. The ovipostor is piceous.

Of this, the smallest and rarest of the Californian species of *Aphrosylus*, I have taken only three specimens, one male and two females. These were captured, together with specimens of *A. prædator*, at Pacific Grove, August 5th. More material is needed before it can be definitely affirmed that the proximal incrassation of the fourth vein is a male character and not an individual variation.

## THE LARVA OF APHROSYLUS.

PLATE IV, FIG. 14.

While observing the flies above described, it occurred to me that their larval and pupal stages might be passed in the salt water. A search for Dipteran larvæ in the tufts of algæ on the rocks was rewarded by finding several forms, some of which evidently belong to Nematocerous families. Two specimens, however, measuring 3.5 and 5 mm. respectively, taken at Pacific Grove during July, are undoubtedly Dolichopodid larvæ, and I did not hesitate to assign them to *Aphrosylus*. They are very probably the larvæ of the commonest species, *A. prædator*. My friend, Dr. H. P. Johnson, has recently given me another specimen, measuring 5.5 mm., taken in the same locality during December last.

These larvæ have the general characters that have been noted for the Dolichopodidæ by Beling, who has described the larvæ of six genera of this family (*Psilopus*, *Neurigona*, *Argyra*, *Porphyrops*, *Systenus*, and *Dolichopus*)[1]. They are glistening white, tapering to a point anteriorly, and less rapidly to the truncated posterior end, which is surrounded by nine flattened lobes. These are arranged as follows: One small lobe in the mid-dorsal line, two larger and dorso-lateral, one on either side, two ventral, largest of all and projecting furthest backward, and, between the dorso-lateral and ventral lobe on either side of the body, two small lateral lobes. The dorso-lateral and ventral lobes are each provided with two fan-shaped tufts of small bristles at their tips. The posterior tracheal openings lie one on either side at the inner bases of the dorso-lateral

[1] Beiträg zur Metamorphose der zweifluegeligen Insecten. Archiv f. Naturg., Jahrg. 41, Bd. 1, 1875, pp. 31–57; and Beiträg zur Metamorphose zweifluegeliger Insecten aus den Familien Tahanidæ, Leptidæ, Asilidæ, Empidæ, Dolichopodidæ, und Syrphidæ. Archiv f. Naturg., Jahrg. 48, Bd. 1, 1882, pp. 187–240. Other species are described by Brauer: Die Zweifluegler des k. k. Museums zu Wien. 3. Systematische Studien auf Grundlage der Dipteren-Larven nebst einer Zusammenstellung von Beispielen aus der Literatur über dieselben und Beschreibung neuer Formen. Denkschr. Akad. Wien. Bd. 47, 1883, pp. 19, 29–30, Taf. IV, figs. 72–75. This work also contains references to papers by v. Vollenhoven, Brown, and Smith, on the larvæ of *Machærium maritimum*. I have not had access to the contributions of these three authors.

lobes. There are twelve well marked segments in the body, and the fifth to eleventh of these, inclusive, have crenulated creeping-pads on their ventral surfaces. There are rudiments of antennæ on the first segment, and powerful jaws, each of which is toothed and connected posteriorly with a pair of delicate chitinous rods that extend back into the third segment. Between the ventral and somewhat shorter pair of these rods lies a curved unpaired chitinous element, the function of which is not clear. Anteriorly the tracheæ open on the second segment.

The four large lobes at the posterior end have been seen in other Dolichopodid larvæ. They are noted by Beling as occurring in all the forms he examined except *Neurigona*. This genus seems to have no such processes, and is described as "am Ende kuppelfoermig gerundet." An unpaired dorsal lobe occurs in *Argyra*. The two pairs of small lateral lobes seem to be peculiar to *Aphrosylus*, unless they occur in the larva of *Machærium*, a description of which I have not seen.

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## DESCRIPTION OF THE FIGURES.

Fig. 1. *Aphrosylus prædator*. Male.
Fig. 2. Antenna of *A. prædator*.
Fig. 3. Hypopygium of *A. prædator* seen from behind.
Fig. 4. Face of male *A. prædator*.
Fig. 5. Face of female *A. prædator*.
Fig. 6. Abdomen of female *A. prædator*.
Fig. 7. Abdomen of male *A. direptor*.
Fig. 8. Wing of *A. direptor*.
Fig. 9. Fore leg of *A. direptor*.
Fig. 10. Antenna of *A. direptor*.
Fig. 11. Abdomen of male *A. grassator*.
Fig. 12. Antenna of *A. grassator*.
Fig. 13. Wing of *A. grassator*.
Fig. 14. Full-grown larva of *Aphrosylus*.